

T. G. CANTRELL.

ADJUSTABLE IGNITER FOR EXPLOSIVE ENGINES.

No. 550,743.

Patented Dec. 3, 1895.

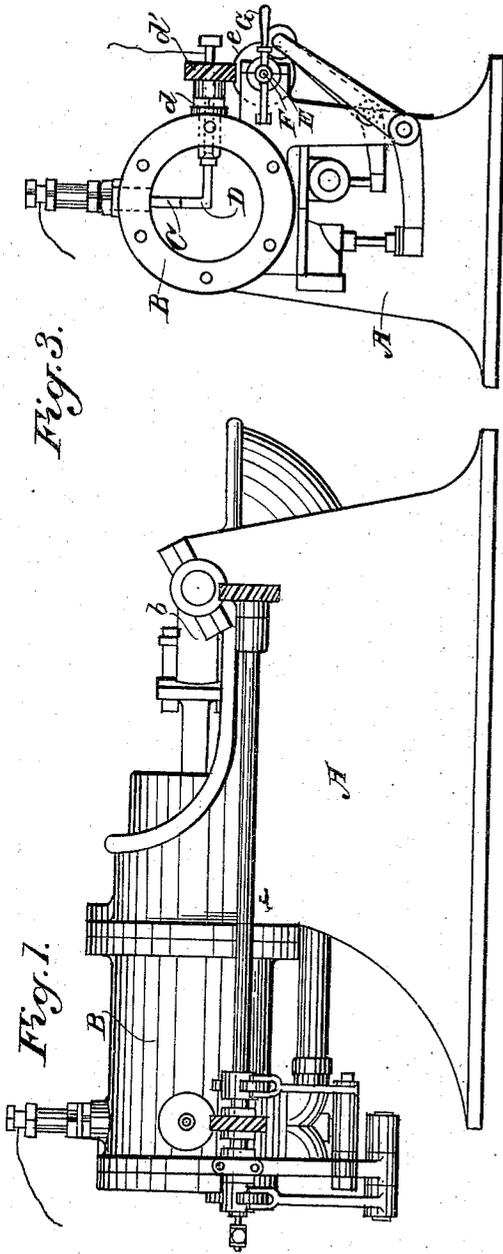


Fig. 3.

Fig. 1.

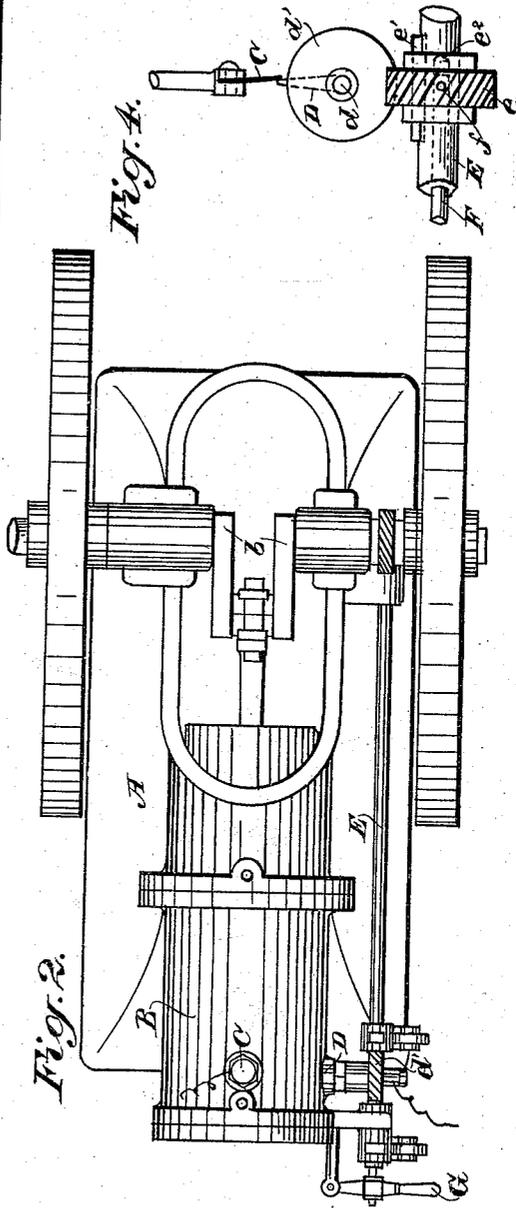


Fig. 2.

Fig. 4.

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(No Model.)

2 Sheets—Sheet 2.

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Fig. 5.

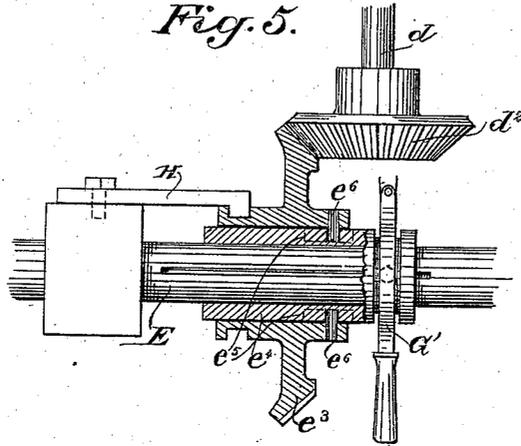


Fig. 6.



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UNITED STATES PATENT OFFICE.

THOMAS G. CANTRELL, OF SAN FRANCISCO, CALIFORNIA.

ADJUSTABLE IGNITER FOR EXPLOSIVE-ENGINES.

SPECIFICATION forming part of Letters Patent No. 550,743, dated December 3, 1895.

Application filed April 8, 1895. Serial No. 545,008. (No model.)

To all whom it may concern:

Be it known that I, THOMAS G. CANTRELL, a citizen of the United States, residing in the city and county of San Francisco, State of California, have invented an Improvement in Adjustable Igniters for Explosive-Engines; and I hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to that class of igniting devices for explosive-engines in which a movable electrode makes contact with a fixed electrode; and my invention consists of the constructions and combinations of devices hereinafter described and claimed.

The object of my invention is to provide a simple and effective means for thus adjusting the contact of the electrodes and varying the time of the explosion, it being found of advantage, especially when the engine is running at high speed, to cause the explosion while the piston is still compressing, though when the engine first starts it is not advisable to do this.

Referring to the accompanying drawings for a more complete explanation of my invention, Figure 1 is a side elevation of an engine, showing the application of one form of adjusting mechanism thereto. Fig. 2 is a plan of the same. Fig. 3 is an end view. Fig. 4 is a detail of the electrodes and adjusting mechanism. Fig. 5 is a section showing another form of adjusting mechanism. Fig. 6 is an elevation of the sleeve of Fig. 5, showing the inclined pinways therein.

A is the frame, and B is the cylinder, of an explosive engine. Extending into the cylinder near one end thereof, as is shown in Fig. 3, is the stationary electrode C, which is properly insulated and connected in the battery-circuit. This electrode may be of any suitable character and is here shown, as appears from Fig. 4, as a spring.

The movable electrode may be of suitable character and may have a reciprocating, vibrating, or rotary motion imparted to it. The form I here show and which I deem best is a rotary one. It is arranged as follows: Extending into the cylinder is a rotary shaft d , which, as shown in Figs. 3 and 4, carries an electrode D, which is adapted during the course of its revolution to be brought into contact with the electrode C and to slip by

and separate from it after said contact, thus making the spark. Upon the outer or exterior end of the shaft d is a gear d' , the teeth of which are inclined, as shown in Fig. 3. Upon a counter-shaft E, which is properly geared up to the driving-shaft b of the engine, is a gear e , the teeth of which are also inclined, as shown in Figs. 1 and 4, and said gear engages with the inclined teeth of the gear d' . The gear e is mounted upon a feather e' on the shaft E, whereby it may be moved thereon, and by this movement it is adapted to vary its engagement with the inclined teeth of the gear d' . Thus by moving the gear e in one direction it will initially and slightly turn the gear d' , so that the electrode D, carried by the shaft d , will be brought into contact sooner with the fixed electrode C, and by moving the gear e in the other direction the gear d' will be slightly reversed, thereby delaying the time of contact of the rotating electrode with the fixed one. Thus the times of the explosion may be varied to suit the conditions of operation.

The means by which the gear e' may be adjusted upon its shaft may be of suitable character, and I have shown them in Figs. 2 and 4 as consisting of a slide-rod F, extending into a suitable socket in the lower end of the shaft E, said slide-rod having a pin f , which extends at right angles from it and is adapted to have sufficient play in an elongated slot e^2 , made in the side of the shaft E. This pin extends into a hole in the gear e , whereby upon the movement of the slide-rod F the gear will be moved on the shaft E as may be desired. A handle or lever G (shown in Fig. 2) is connected with the slide-rod F to operate it.

Another form of electrode-adjusting mechanism is shown in Figs. 5 and 6. In this form the gear d^2 on shaft d is an ordinary beveled gear, and the gear e^3 on counter-shaft E is also a beveled gear. The adjustment of the electrodes is effected by turning the gear e^3 on its axis, and this is accomplished by mounting it upon a sleeve e^4 , mounted and adapted to slide on a feather on shaft E. In this sleeve are inclined pinways e^5 , Fig. 6, in which play pins e^6 from the hub of gear e^3 , whereby the lineal movement of the sleeve will axially turn the gear upon said sleeve at

the same time that the pins connect said sleeve and gear to make them rotate together. The gear is held from lineal movement by an arm H, fixed to a bearing of the shaft E and engaging a circumferential groove in the hub of the gear. The sleeve is caused to slide by means of a pivoted lever G', engaging one end of it.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. An igniter for explosive engines consisting of a fixed and a movable electrode, mechanism for operating the movable electrode and means comprising intermeshing gears one movable relatively to the other for adjusting said mechanism to vary the times of contact of the electrodes, whereby the time of the explosions may be regulated.

2. An igniter for explosive engines, consisting of a fixed electrode, a rotary electrode adapted in the course of each revolution to be brought into contact with and to separate from the fixed electrode, mechanism for operating the rotary electrode, and means for adjusting said mechanism to vary the times of contact of the electrodes whereby the time of the explosions may be regulated, consisting of intermeshing gears and devices for moving one relatively to the other.

3. An igniter for explosive engines, consisting of a fixed electrode, a rotary electrode adapted in the course of each revolution to be brought into contact with and to separate from the fixed electrode, mechanism for operating the rotary electrode, and means for adjusting said mechanism to vary the times of contact of the electrodes whereby the time of the explosions may be regulated, consisting of intermeshing gears with inclined teeth, one of said gears being slidable on its shaft.

4. An igniter for explosive engines, consisting of a fixed electrode, a rotary electrode adapted to pass at each revolution in electrical contact with the fixed electrode and to separate therefrom, a shaft carrying said rotary electrode, a gear upon said shaft with inclined teeth, a counter-shaft driven by the engine, a gear mounted upon a feather on said counter-shaft and having inclined teeth engaging the inclined teeth of the gear on the electrode shaft, and means for sliding the gear on the counter-shaft so as to vary its engagement with the gear of the electrode shaft whereby the time of the explosion may be varied.

5. An igniter for explosive engines, consisting of the fixed electrode, a rotary electrode adapted to pass at each revolution in electrical contact with the fixed electrode and to separate therefrom, a shaft carrying said rotary electrode, a gear upon said shaft with inclined teeth, a counter-shaft driven by the engine, a gear mounted upon a feather on said counter-shaft and having inclined teeth engaging the inclined teeth of the gear on the electrode shaft, and means for sliding the gear of the counter-shaft so as to vary its engagement with the gear of the electrode shaft whereby the time of the explosion may be varied, consisting of the slide rod seated in a socket in the counter-shaft and having a pin extending outwardly and playing in a slot in said counter-shaft and connected with the gear thereon.

In witness whereof I have hereunto set my hand.

THOMAS G. CANTRELL.

Witnesses:

JAMES L. KING,
S. H. NOURSE.